Charles Darwin University

Final Examination

Family Name						
Given Name/s						
Student Number						
Teaching Period	Semester 1, 2019					

MLS100 – Medical Laboratory Science	DURATION	
	Reading Time:	10 minutes
	Writing Time:	120 minutes

INSTRUCTIONS TO CANDIDATES

Section A: Multiple Choice Questions: Total No of Marks for this section: 50
This section should be answered on the Answer Sheet provided. Please ensure that your name and student number have been written on the Answer sheet and place in the completed answer Booklet.

Marks for each question are indicated. Suggested Time allocation for Section A: 60 mins

Section B: Short Answer Questions. Total No of Marks for this section: 50
This section should be answered in the Answer Booklet provided.

Marks for each question are indicated. Suggested Time allocation for Section B: 60 mins

EXAM CONDITIONS

You may begin writing from the commencement of the examination session. The reading time indicated above is provided as a guide only.

This is a CLOSED BOOK examination

Any non-programmable calculator is permitted

No handwritten notes are permitted

No dictionaries are permitted

ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED
No additional printed material is permitted	1 x 8 Page Book 1 x Scrap Paper College Multiple Choice Answer Sheet

THIS EXAMINATION IS PRINTED DOUBLE-SIDED.

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Section A

Multiple Choice Questions

Total No of Marks for this section: 50

This section should be answered on the Answer Sheet provided. Please ensure that your name and student number have been written on the Answer sheet and place in the completed answer Booklet.

Marks for each question are indicated. Suggested Time allocation for Section A: 60 mins

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Section B

Short Answer Questions

Total No of Marks for this section: 50

This section should be answered in the Answer Booklet provided.

Marks for each question are indicated. Suggested Time allocation for Section B: 60 mins

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Question 1

Ben a laboratory technologist is updating the chemical inventory. His supervisor has asked him to collect any chemicals that are out of date or no longer used and to box them up for disposal. As he scans the shelves, Ben notices that there is a litre of glacial acetic acid on the top shelf that has been in the lab for years. He is not sure when it was opened because the date is missing, but he knows the chemical is no longer used, and he puts it in the box for disposal. He also finds a small bottle of sodium azide and puts it in the disposal box as well. There are two new chemicals that come with the chemistry kits, but he does not add these to the list, leaving that for the next shift. Ben decides to save the laboratory some money and dispose of the acetic acid and sodium azide himself by pouring them down the drain. Ben's supervisor left him a note to change the gas tank on the incubator. Ben removes the valves and replaces the tank. He leaves the empty tank sitting beside the newly installed tank. His supervisor also asked him to check the eyewash; Ben was supposed to do this 2 weeks ago but forgot. He removes the eyewash caps, turns the water on and off quickly, and replaces the caps. At 6:45 am, Ben puts on his lab coat as the day shift arrives. At 7:30 am, he hangs the coat up with the lab coats that have just been delivered from the laundry and hurries out the door, happy to be heading home.

What safety violations has Ben committed?

(Marks: 5)

Question 2

Define the following terms and list the possible causes of:

a) erythrocytosis

b) neutropenia

c) stomatocytosis

d) thrombocytosis.

(Marks: 8)

Question 3

What is the most common staining method for tissue? What colour do you expect if this staining method is applied on nucleus? What staining method is the common choice for blood?

(Marks: 3)

Question 4

(a) Name the primary stain used in a microbiology laboratory and describe the procedure.

(Marks: 5)

(b) Explain how this stain is used to differentiate microorganisms.

(Marks: 2)

Question 5

Besides blood, what are some other body fluids that may require laboratory testing?

(Marks: 5)

Question 6

(a) Explain the basic components of a spectrophotometer.

(Marks: 4)

(b) Prepare a standard curve from the data below (please use **graph paper** at the end of the exam paper).

Standards	Concentration (mM)	Absorbance (520 nm)
1	1	0.14
2	2	0.31
3	4	0.83
4	7	1.46
5	10	2.08

What is the concentration of the **two** (2) unknowns, given their absorbance is 1.45 and 1.98, respectively.

(Marks: 5)

(c) Suppose the spectrophotometer has not been recently calibrated and its photometric accuracy is incorrect. Will the results of a quantitative assay be inaccurate if a standard curve is used?

(Marks: 1)

Question 7

A stock solution of NaCl (1mg/ml) was serially diluted through the following scheme:

Step 1: 1 ml stock solution + 4 ml diluent,

Step 2: 1 ml of the dilution from step 1 + 9 ml of diluent,

Step 3: 1 ml of the dilution from step 2 + 19 ml diluent.

(a) What is the total dilution factor?

(b) What is the final concentration of the solution?

(Marks: 4)

Question 8

(a) Define the following terms:

false positive

false negative

(Marks: 2)

(b) Match the following potential causes of **false-positive (a)** or **false-negative (b)** results with chemical reagent strips.

1) ____ proteins are present without the presence of albumin
2) ____ a blue color forms for the protein reaction, if the urine is exposed to the reagent strip for too long
3) ____ the reaction for protein may be produced, if a urine specimen is exceptionally alkaline or highly buffered
4) ____ in the reaction to detect blood in the urine, microbial peroxidase activity associated with urinary tract infection can produce
5) ____ in the detection of blood in the urine, ascorbic acid in urine specimens containing more than 25 mg/dl.
6) ____ medications (e.g., azo-containing compounds or dyes that color urine red or that turn red in an acidic medium when testing for nitrite for the detection of bacteria in urine).

(Marks: 6)

…….END OF THE EXAM…….